

Patent Claims

1. A lightweight valve (1), in particular for internal combustion engines, comprising a valve stem (3), a hollow valve cone (7) and a valve disk (13), the valve cone and the valve disk (13) together forming a hollow space, characterized in that the valve disk (13) is provided with a gripping receiver (23) for the valve stem (3).
2. The lightweight valve as claimed in claim 1, characterized in that the gripping receiver (23) is formed by means of a number of reinforcing ribs (25; 25A, 25B) designed on the valve disk (13).
3. The lightweight valve as claimed in claim 1 or 2, characterized in that, seen in a top view of that flat side of the valve disk (13) facing the hollow space, the reinforcing ribs (25; 25A, 25B) extend radially or in a radial direction in relation to the longitudinal central axis of the valve disk (13).
4. The lightweight valve as claimed in one of claims 1 to 3, characterized in that three reinforcing ribs (25) arranged at a spacing of 120° from one another are provided.
5. The lightweight valve as claimed in one of claims 1 to 4, characterized in that that end face (27) of the reinforcing ribs (25) facing the valve disk center in each case forms a wall portion of the gripping receiver (23).
6. The lightweight valve as claimed in one of claims 1 to 5, characterized in that the reinforcing ribs (25) are designed as rectilinear strips.
7. The lightweight valve as claimed in one of claims 1 to 6, characterized in that the height of the reinforcing ribs (25) increases in the direction toward the valve disk center.

8. The lightweight valve as claimed in claim 7, characterized in that the height of the reinforcing ribs (25) rises linearly from their radially external end in the direction of the valve disk center.
9. The lightweight valve as claimed in one of claims 7 or 8, characterized in that a linearly rising first portion (35) of the reinforcing ribs (25) is adjoined by a second reinforcing rib portion (37) of constant or essentially constant height.
10. The lightweight valve as claimed in one of claims 7 or 8, characterized in that a linearly rising first portion (35) of the reinforcing ribs (25) is adjoined by a second reinforcing rib portion which extends so as to complement the inner wall of the hollow valve cone.
11. The lightweight valve as claimed in one of claims 1 to 10, characterized in that the reinforcing ribs (25) are in the region of the gripping receiver (23) provided with a cutout (39) which reduces the size of the reinforcing rib end faces (27).
12. The lightweight valve as claimed in one of claims 1 to 11, characterized in that the upper narrow side (31) of the reinforcing ribs (25) bears against the inner wall (29) of the hollow valve cone (7) at least in sections.
13. The lightweight valve as claimed in one of claims 1 to 12, characterized in that the reinforcing ribs (25) and the valve cone (7) are interconnected by means of a material connection.
14. The lightweight valve as claimed in one of claims 1 to 13, characterized in that the valve stem (3), the valve disk (13) and the valve cone (7) are in each case separate components, and in that the connection of the valve cone (7) to the valve disk (13) and the valve stem (3) is designed in such a way that the valve cone (7) is at least virtually free from forces acting on the valve disk (13) during operation of the lightweight valve.

15. A method for manufacturing a lightweight valve as claimed in one of claims 1 to 14, with the following steps:

- production of a first one-piece component forming the valve disk (13) and the gripping receiver (23) by casting, forming and/or by means of a powder metallurgy method;
- production of a second one-piece component forming the valve stem (3);
- production of a third component forming the valve cone (7), preferably by means of a forming operation;
- joining the first and second components together and connecting them by means of a material, non-positive and/or positive connection, and
- pushing the hollow third component onto the second component and connecting the third component to the first and second components by means of a material, non-positive and/or positive connection.